

REMARKS

In the Office Action, claims 1-7, 9-15, 17-23, 25, and 26 were rejected. By the present Response, claims 1, 2, 5, 9, 10, 17, 18, and 25 are amended. Upon entry of the amendments, claims 1-7, 9-15, 17-23, 25, and 26 will remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claims 17-23 as indefinite under 35 U.S.C. § 112, second paragraph. In particular, the Examiner rejected claim 17 for reciting “a gantry comprising a distributed x-ray source configured to rotate about a volume of interest in eight or more seconds.” Office Action, p. 2. The Examiner further stated: “It is unclear whether this rotational motion refers to the gantry or the distributed x-ray source.” Office Action, p. 2.

With regard to claim 17, the claim has been amended and, as amended, is no longer believed to be open to the alternative interpretation proposed by the Examiner. As this amendment merely clarifies that the distributed X-ray source, at the very least, rotates about the volume of interest. The amendment is not believed to narrow the scope of the claims. In view of this amendment, withdrawal of the present rejection of claim 17 (and those claims depending therefrom) under 35 U.S.C. § 112, second paragraph is, respectfully requested.

Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 17 and 25 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,229,870 (the Mogan reference). A *prima facie* case of anticipation under 35 U.S.C. § 102 requires a showing that each limitation of a claim is found in a single reference, practice or device. *In re Donohue*, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985). Applicants respectfully traverse this rejection.

In the present case, the rejection is inappropriate because the cited prior art reference does not disclose every element of the Applicants' claims. As amended, independent claim 17 recites in part, "wherein the rotational *period* of the distributed X-ray source about a volume of interest is *greater than eight seconds*." (Emphasis Added). Independent claim 25 contains a similar limitation. The Examiner alleged, "[u]nlike claims 1 and 9, which claim a rotational period (*i.e.*, rotational speed), claims 17 and 25 claim only a rotational duration, which does not set forth a rotational speed." Office Action, p. 16. The Applicants do *not* agree that the prior language of claim 17 set forth a duration, as asserted by the Examiner, or that a rotational period is the same as rotational speed. In particular, the Applicants note that the prior language of claim 17 recited a distributed X-ray source configured to rotate about a volume of interest *in* eight or more seconds, not *for* eight or more seconds. Nevertheless, Applicants have taken this opportunity to clarify in claims 17 and 25 that the rotational *period* of the X-ray source is greater than eight seconds. This amendment is not believed to be narrowing in view of the original claim language.

With regard to the present rejection, the Morgan reference makes *no* disclosure concerning the rotational period of the X-ray source. Consequently, there is no teaching in the Morgan reference which discloses or suggests a rotational period of greater than eight seconds. To the extent that the Morgan reference is concerned with rotational period, Morgan discusses solving the problem of *long* imaging times and stresses that advantages of the Morgan invention include significantly improved imaging time and imaging in substantially real time. Morgan, col. 1, lines 26-28, 38-39; col. 3, lines 1-5; and col. 5, line 65 – col. 6, line 1. Therefore, it is clear that the Morgan reference does not disclose, or even suggest, *rotational periods* such as those contemplated in claims 17 and 25.

Furthermore, though the Examiner fails to *explicitly* state that he is relying on a theory of inherency in his rejection, he clearly does rely on inherency, stating: "Morgan disclosed all of the positively recited structures in the claims. As such, the gantry disclosed by Morgan is as capable of rotating about a volume of interest in eight or more seconds as

the gantry of the claims.” Office Action, p. 3. The Applicants respectfully remind the Examiner that the present claims recite a rotational period *greater* than eight seconds, not a rotational period that *can be* greater than eight seconds. As the Examiner is aware, for a feature to be inherent it must *necessarily* be present in the reference. It is clearly not true that the X-ray source of the Morgan reference *necessarily* has a rotational period greater than eight seconds. Therefore, the Morgan reference does not inherently disclose this recited subject matter of claims 17 and 25. Absent a showing of the recited *rotational period*, either explicitly or inherently, in the Morgan reference, the Applicants request withdrawal of the rejection of claims 17 and 25 as being anticipated by Morgan.

Rejections Under 35 U.S.C. § 103

The Examiner rejected independent claims 1, 9, 17, and 25 under 35 U.S.C. § 103(a) as obvious over the Morgan reference in view of U.S. Patent No. 5,175,754 (the Casey reference). The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). To establish a *prima facie* case, the Examiner must not only show that the cited references include *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983); M.P.E.P. § 2145. Moreover, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (CCPA 1959); see M.P.E.P. § 2143.01. Applicants respectfully traverse these rejections.

The obviousness rejection based on the Morgan and Casey references fails to support a *prima facie* case of obviousness since both references, taken alone or together,

fail to disclose each and every element recited in the claims. Particularly, as recited in claims 1 and 9, the claimed act of “rotating a distributed X-ray source about a volume of interest, wherein a rotational period of the distributed X-ray source is *greater* than eight seconds” is not taught in either reference. (Emphasis added). Claims 17 and 25 recite similar subject matter, as quoted above.

The Examiner suggests that modifying the Morgan invention to have a rotational period of greater than 8 seconds would be obvious since it would result in higher resolution images. Office Action, p. 4-5 and p. 16. This reasoning, however, is only true in limited circumstances as described in Casey, i.e., when motion is not present. Casey, col. 2, lines 1-5. Furthermore, this reasoning neglects the obvious reasons why one of ordinary skill in the art would *not* increase gantry rotation speed in the manner described by the Examiner. Increasing gantry rotation speed in the manner described by the Examiner would also increase scan time, particularly if multiple rotations are contemplated. One of ordinary skill in the art might not view such a scan time/resolution tradeoff to be worth while beyond an eight second rotation period. Therefore, one of ordinary skill in the art would recognize that, beyond a certain point, increased scan time is not desirable for incrementally better resolution.

Furthermore, the Examiner’s reasoning rests on the premise that by rotating the X-ray source of the Casey reference slower than eight seconds per rotation, more than 7,872 projections can actually be acquired, i.e., that the CT machine is capable of emitting X-rays at more than 7,872 angular positions. Casey, col. 1, line 61 – col. 2, line 5. Absent some showing by the Examiner that the commercial CT system as described in the Casey reference is actually capable of acquiring projection data at more than 7,872 angular positions in one rotation, one of ordinary skill in the art would *not* be motivated to increase scan time to merely get the *same* amount of projection data. In other words, once the number of projections that can be acquired in a rotation is maximized, the resolution is also maximized, and *simply rotating the X-ray source slower won’t result in*

any improvement in resolution, i.e., more projections won't be acquired. The Examiner ignores this point and provides no basis for why one of ordinary skill in the art would believe resolution could be increased by rotating an X-ray source for more than eight seconds. In view of the deficiency of the cited art in its failure to disclose all elements recited in claims 1, 9, 17, and 25, no *prima facie* case of obviousness exists.

Moreover, there is no motivation to combine the Morgan and Casey references in the manner suggested by the Examiner. In particular, neither the Casey nor Morgan references disclose a motivation for CT gantries to have rotational periods *greater* than eight seconds (lower rotational speeds). In fact, as noted above, the Morgan reference discusses solving the problem of long imaging times and stresses that advantages of the Morgan invention include significantly improved imaging time and imaging in substantially real time. Morgan, col. 1, lines 26-28, 38-39; col. 3, lines 1-5; and col. 5 line 65 – col. 6, line 1. Thus, the Morgan reference actually *teaches away* from using an X-ray source with a rotational period *greater* than eight seconds. In view of the stated motivations provided in Morgan for faster, even real-time, imaging, one of ordinary skill in the art would not be motivated to modify Morgan in the manner suggested by the Examiner such that scan times were *increased*. Indeed, the only reasonable motivation to combine the Morgan and Casey references in the manner described by the Examiner would be to deprecate the presently claimed subject matter based on the disclosures within the Applicants' application. However, such hindsight analysis is not permitted. Accordingly, the Applicants respectfully request allowance of independent claims 1, 9, 17, and 25.

With regard to the dependent claims, the Applicants note that the Examiner has rejected these claims in view of the Morgan reference or the Morgan and Casey references in conjunction with U.S. Patent No. 5,383,231 (the "Yamagishi reference") and/or U.S. Patent No. 6,466,640 (the "Taguchi reference"). These references, however, fail to obviate the deficiencies of the Morgan and Casey references discussed above.

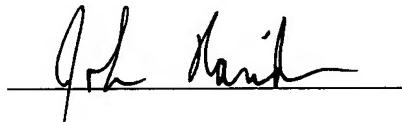
Therefore, the claims respectively depending from independent claims 1, 9, 17, and 25 are believed to be allowable based on their dependency as well as for the unique features recited in each dependent claim. Reconsideration and allowance of all pending claims is, therefore, respectfully requested.

Conclusion

In view of the remarks and amendments set forth above, the Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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